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Tagging Summary of American Shad, Alosa Sapidissima (Wilson) and Striped Bass, Roccus Saxatilis (Walbaum), Bureau of Commercial Fisheries Biological Laboratory Beaufort, N.C., 1950-65

By Paul R. Nichols and Randall P. Cheek

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SPECIAL SCIENTIFIC REPORT–FISHERIES No. 539

UNITED STATES DEPARTMENT OF THE INTERIOR
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By

PAUL R. NICHOLS AND RANDALL P. CHEEK

United States Fish and Wildlife Service
Special Scientific Report--Fisheries No. 539

Washington, D.C.

July 1966

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Tagging Summary of American Shad, Alosa Sapidissima (Wilson) and Striped Bass, Roccus Saxatilis (Walbaum), Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N.C., 1950-65

By

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ABSTRACT

Number and type of tags applied on American shad, Alosa sapidissima (Wilson), and striped bass, Roccus saxatilis (Walbaum), in 1950-65, are summarized in tables. A detailed description is given of each type of tag and how it was affixed to the fish. The report also gives the purpose of each tagging study and the status of reports on the findings.

The Bureau of Commercial Fisheries has used mark-and-recapture techniques widely on aquatic animals to study movements, and to estimate abundance, growth, and mortality of exploited populations. This paper presents a summary of tagging studies of American shad, Alosa sapidissima (Wilson), and striped bass, Roccus saxatilis (Walbaum), performed by the Bureau's Biological Laboratory, Beaufort, N.C., and cooperating agencies, 1950-65. These studies included tagging 40,093 striped bass in 1955-65, and 27,042 American shad in 1950-65 (see fig. 1 for the types of tags used). In addition, 70,000 young shad were marked by fin clipping.

The following information is presented in tables 1-6:

Number and type of tags applied--Number and type of tags applied on two species in different States and a detailed description of each tag and how it was affixed to the fish.

Locality and time of tagging--River or body of water and month and year fish were collected, tagged, and released.

Collection gear--Type of gears used to collect fish for tagging.

Size and age of fish tagged--Range of fork length to nearest 0.1 inch, and age groups in years of tagged fish released for each study.

Nature of the study--Purpose of the tagging and status of reports on the findings are given. Published reports are cited, and preliminary findings are given for unpublished reports. Analyses of unpublished tagging data are in progress and reports are to be published.

This report will be useful to agencies in the planning of tagging studies of these species, especially in the development of proposed research projects under Public Law 89-304 (Anadromous Fish Program Act). Detailed information on the tagging studies, such as number of tags recovered, recovery location, ..., is available from the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N.C. 28516.

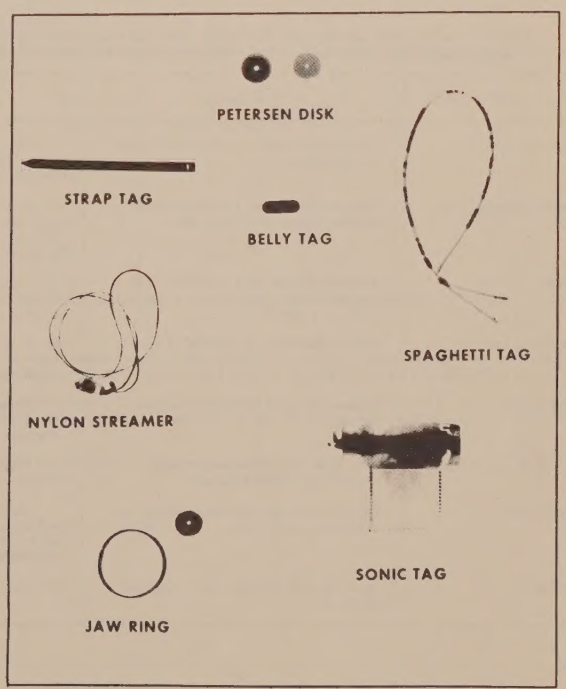

FIGURE 1.--Types of tags that the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N.C., used to mark American shad and striped bass, 1950-65.

Table 1.--Number and type of tags and marks applied on American shad, Alosa sapidissima (Wilson), and striped bass, Roccus saxatilis (Walbaum), in the different states by the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N. C., and cooperative agencies, 1950-65

Tag type and species	N. H.	Mass.	Conn.	N. Y.	N. J.	Md.	Va.	N. C.	S. C.	Ga.	Fla.	Total
Petersen tag												
American shad	--	--	2,867	3,581	1,905	9,995	2,082	374	128	235	1,832	22,999
Striped bass	42	606	572	--	424	9,120	754	1,113	--	--	--	12,631
Nylon streamer tag												
American shad	--	--	419	--	--	--	842	956	--	--	--	2,217
Striped bass	--	--	--	--	--	16,326	1,675	6,731	--	--	--	24,732
Spaghetti tag												
American shad	--	--	40	--	--	--	--	--	--	--	--	40
Striped bass	--	--	--	--	--	--	--	1,448	--	--	--	1,448
Jaw ring tag												
American shad	--	--	--	--	--	--	--	--	--	--	--	--
Striped bass	--	--	--	--	--	1,240	--	--	--	--	--	1,240
Strap tag												
American shad	--	--	211	768	--	--	--	--	--	--	--	979
Striped bass	--	--	--	--	--	--	--	--	--	--	--	--
Belly (internal) tag												
American shad	--	--	--	--	--	737	--	--	--	--	--	737
Striped bass	--	--	--	--	42	--	--	--	--	--	--	42
Sonic tag												
American shad	--	--	--	--	--	70	--	--	--	--	--	70
Striped bass	--	--	--	--	--	--	--	--	--	--	--	--
Fin clip												
American shad	--	--	70,000	--	--	--	--	--	--	--	--	70,000
Striped bass	--	--	--	--	--	--	--	--	--	--	--	--
Total American shad	0	0	73,537	4,349	1,905	10,802	2,924	1,330	128	235	1,832	97,042
Total striped bass	42	606	572	--	466	26,686	2,429	9,292	--	--	--	40,093

Table 2.--Description of the tags and marks used, and methods of applying them, on American shad, Alosa sapidissima (Wilson), and striped bass, Roccus saxatilis (Walbaum), by the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N. C., and cooperative agencies, 1950-65

Type of tag or mark	Attachment	Description
Petersen tag	Through dorsum by a stainless steel or nickel pin	1. Two 7/16-inch diameter red plastic discs 0.037 inch thick, with 0.038-inch diameter hole. One disc was blank; the other bore an identifying number on one side and an address and reward notice on the other.
Nylon streamer tag	Through dorsum by a 7-inch carpet needle having a notched eye	2. A single plastic disc (same as numbered disc for 1), or a plastic tag ¼ inch wide and 5/8 inch long to which a loop of nylon net twine was tied. After insertion, the disc or tab was passed through the loop and tied by overhand knot, allowing tag to trail along caudal peduncle.
Spaghetti tag	Through dorsum by a solid pointed hollow needle 7 inches long and 0.12 inch in diameter	3. Single piece of white vinylite tubing 12 inches long, 0.0625-inch outside diameter. Identifying number, address, and reward notice were painted by hand on its surface with vinylite ink. After insertion, the two ends were tied together in a figure-eight knot.
Jaw ring tag	Around mandible by special pliers	4. A single plastic disc (same as numbered disc for 1 and 2), attached to either a 3/4-inch or 1-inch diameter stainless steel split ring. Size of fish determined ring diameter.
Strap tag	Clamped on gill cover by special pliers	5. Noncorrosive metal strap, 2½ inches long and 3/16 inch wide, with pointed end that clamped through small slot in other end of strap. Identifying number and address stamped on one side.
Belly (internal) tag	Into body cavity through narrow incision in abdominal wall	6. Single red plastic rectangular tag, 3/4 inch long, 3/16 inch wide, and 0.0375 inch thick. Identifying number and reward notice on one side and address on the other.
Sonic tag	Through dorsum by plastic strap and stainless steel pin	7. Two transparent plastic toroid tags were used: (1) wt. 16 grams (dry weight), life span of 4-5 days; and (2) wt. 20 grams (dry weight), life span of 12-13 days. Each emits 2-5 pulse per second signal at 158 kilocycles when activated. Monitors with tape recorders have 2,500-foot tracking range.
Fin-clip	Right pelvic fin by small surgical scissors	8. Fin clipped at separation of radial bones and dermal fin rays.

Table 3.--Tagging and marking summary of American shad, Alosa sapidissima (Wilson), and striped bass, Roccus saxatilis (Walbaum), in the New England States by the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N. C., and cooperative agencies, 1950-65

State	Species	Locality	Month/year	Collection gear	Type of tag or mark	Number of fish tagged	Fork length range (Inches)	Age group (Years)	Nature of the study
New Hampshire	American shad	--	--	--	--	None	--	--	--
	Striped bass[1]	Great Bay	May, July, & Aug./1964	Pound and trap nets	Petersen tag	42	14.0-19.5	II-IV	Migration and racial data[2]
Massachusetts	American shad	--	--	--	--	None	--	--	--
	Striped bass[1]	Merrimac River	May-July/1962-65	Pound and trap nets and hook and line	Petersen tag	343	10.3-23.8	I-VI	Migration and racial data[2]
		Parker River	May-Oct./1961-63	do.	do.	68	do.	do.	Do.
		Plum Island	May-June/1962	do.	do.	6	do.	do.	Do.
		do.	Aug.-Oct./1961-64	do.	do.	46	do.	do.	Do.
		Taunton River	May/1955	do.	do.	2	do.	do.	Do.
		Massachusetts Bay	May-Aug./1957-60	do.	do.	35	do.	do.	Do.
		Cape Cod Bay	May-Oct./1955-60	do.	do.	75	do.	do.	Do.
		Buzzards Bay and tributaries	May-Oct./1957&61	do.	do.	31	do.	do.	Do.
Connecticut	American shad	Connecticut River	Apr.-June/1951	Pound and anchor gill nets	Petersen tag Strap tag	1,271 211	13.3-22.1	III-X	Population estimate and fishing rate[3]
		do.	Oct./1952	Haul seine	Right pelvic fin clip	70,000	2.8-5.2	0	Validity of scale annuli[4]
		do.	May-June/1956	Holyoke fish lift trap	Petersen tag	1,060	13.5-19.6	III-X	Success of downstream movement past dams and homing tendency[5]
		do.	Apr./1957	Pound net	Nylon streamer tag Petersen tag	382 493	14.0-21.8	do.	Population estimate and fishing rate[6]
		do.	Apr.-May/1958	Drift gill net	Nylon streamer tag Petersen tag Spaghetti tag	37 43 40	13.2-22.0	do.	Tag selectivity[7]
	Striped bass[8]	Thames River	Apr.-May/1956	Gill and pound nets	Petersen tag	92	10.0-24.0	I-VI	Migration and racial data[2]
		do.	Oct.-Dec./1956-57	do.	do.	163	do.	do.	Do.
		Connecticut River	June-Sept./1957-58	do.	do.	106	do.	do.	Do.
		Long Island Sound	June/1957	do.	do.	1	do.	do.	Do.
		Poquonack Cove	Apr.-May/1956	do.	do.	84	do.	do.	Do.
		Niantic Bay	Mar.-June/1957	do.	do.	93	do.	do.	Do.
		Greenwick Cove	Apr./1957	do.	do.	33	do.	do.	Do.

[1]Cooperative study with Massachusetts Division of Marine Fisheries.

[2]Unpublished: Preliminary findings indicated that most recaptured fish were taken in Massachusetts waters during summer and early autumn and then there appeared to be a southward coastal movement. Most of the recaptures south of the Massachusetts coast were made in Delaware and Chesapeake Bays.

[3]Fredin (1954). This paper presents a method of analyzing catch, fishing rate, and tagging data which was used to estimate the size of the shad runs in the Connecticut River for each year 1935-51. Analyses indicated that more than 80 percent of the fluctuations in the size of these runs can be explained by changes in the size of the spawning escapement from the fishery.

[4]Judy (1961). This paper validates annuli and spawning marks as criteria for age determination of American shad.

[5]Unpublished: Too few tags returned to make valid conclusions.

[6]Unpublished: Findings were almost identical to those obtained in the 1951 study by Fredin (1954).

[7]Unpublished: Tag returns were too few for valid conclusions.

[8]Cooperative study with the Connecticut State Board of Fisheries and Game.

Table 4.--Tagging summary of American shad, Alosa sapidissima (Wilson), and striped bass, Roccus saxatilis (Walbaum), in the Middle Atlantic States by the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N. C., and cooperative agencies, 1950-65

State	Species	Locality	Month/year	Collection gear	Type of tag	Number of fish tagged	Fork length range	Age group	Nature of the study
							(Inches)	(Years)	
New York	American shad	Hudson River	Apr.-May/1950-51	Drift and stake gill nets	Petersen tag Strap tag	2,527 768	13.7-22.8	III-VIII	Population estimate and fishing rate[1]
		do.	Apr.-May/1956	Pound net	Petersen tag	1,054	13.2-21.3	do.	Origin of shad taken off coasts of New Jersey and Staten Island[2]
	Striped bass	--	--	--	--	None	--	--	--
New Jersey	American shad	Beach Haven and Point Pleasant	Mar.-May/1956	Pound net	Petersen tag	1,905	11.5-23.0	III-VIII	Origin of shad taken off coasts of New Jersey and Staten Island[2]
	Striped bass	Great Egg Harbor	Jan.-Feb./1955-57	Gill and pound nets and haul seine	Petersen tag	88	7.5-34.5	0-XI	Migration and racial data[3]
		Barnegat Bay	May/1958	do.	do.	2	do.	do.	Do.
		Raritan Bay	do.	do.	do.	19	do.	do.	Do.
		Sandy Hook Bay	do.	do.	do.	21	do.	do.	Do.
		Delaware River	June/1962	do.	do.	5	do.	do.	Do.
		do.	Sept.-Nov./1962-65	do.	do.	201	do.	do.	Do.
		Mullica River	Dec./1955 & Mar./1957	do.	Belly tag	42	do.	do.	Do.
		Maurice River	May/1965	do.	Petersen tag	88	do.	do.	Do.

[1]Talbot (1954). This paper gives the estimated weight of the total population entering the Hudson River in 1951 and the calculated weight of total run and spawning escapement for each year 1915 through 1950. It was shown that about 85 percent of the variation in size of the run between 1920 and 1951 could be attributed to the size of the escapement from the fishery.

[2]Nichols (1958). This paper concluded that in 1956 the New Jersey-New York ocean pound net catch of shad was composed of 76 percent Hudson River fish and 13 percent Connecticut River fish.

[3]Unpublished: Tag returns, as yet, have not been analyzed.

Table 5.--Tagging summary of American shad, Alosa sapidissima (Wilson), and striped bass, Roccus saxatilis (Walbaum), in the Chesapeake Bay States by the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N. C., and cooperative agencies, 1950-65

State	Species	Locality	Month/year	Collection gear	Type of tag	Number of fish tagged	Fork length range (Inches)	Age group (Years)	Nature of the study
Maryland[1]	American shad	Patuxent River	Sept./1950	Haul seine	Belly tag	737	2.8-5.0	0	Homing tendency[2]
		Potomac River	Apr.-May/1952	Pound net	Petersen tag	321	12.5-20.0	III-VI	Population estimate and fishing rate[3]
		Chesapeake Bay	do.	do.	do.	921	10.8-20.6	II-VI	Population estimate and fishing rate[4]
		Susquehanna River	do.	do.	do.	1,165	10.8-20.0	do.	Feasibility of shad transport[5]
		do.	Apr.-June/1958-60	do.	do.	6,938	11.5-20.8	do.	Feasibility of fish passage at Conowingo Dam[6]
		do.	Apr.-June/1964-65	Drift gill and pound nets and trap	Petersen tag Sonic tag	650 70	10.5-21.2	do.	Movement of transplanted fish in impoundments and upper river[7]
	Striped bass[8]	Upper Chesapeake Bay and Nanticoke and Choptank Rivers	Oct.-July/1955-57	Pound net and haul seine	Petersen tag Jaw ring tag	236 699	7.3-17.8	I-IV	Migration and homing tendency[9]
		do.	Nov.-Mar./1959-61	Stake and drift gill nets, haul seine, and pound net	Nylon streamer tag	104	5.8-46.6	I-XV	Do.
		do.	Apr.-Oct./1959-61	do.	Petersen tag Nylon streamer tag Jaw ring tag	184 1,080 249	do.	do.	Do.
		do.	Jan.-May/1964-65	Drift gill net and haul seine	Petersen tag	2,184	12.0-44.0	II-XIV	Do.
		Susquehanna River	Oct./1958-59	Pound net	do.	5,078	11.9-28.0	I-VI	Spawning success and movement of fish released in Conowingo impoundment[6]
		Chesapeake Bay and tributaries	Jan.-Dec./1957-58	Stake and drift gill nets, haul seine, and pound net	Petersen tag Nylon streamer tag Jaw ring tag	1,438 1,514 292	7.3-44.0	I-XIV	Suitability of tags[10] and movement[11]
Maryland	Striped bass[8]	Potomac River	Jan.-Dec./1959-61	Pound and stake gill nets and trawl	Nylon streamer tag	8,955	7.9-46.5	I-XIX	Seasonal movement[12] and population estimate[13]
		Chesapeake Bay	Jan.-Mar./1962-63	Drift gill net	do.	4,673	10.6-22.0	II-VI	Movement and population estimate[14]

[1]Includes American shad and striped bass tagged and released in Pennsylvania waters of the Susquehanna River.

[2]Unpublished: Cooperative study with Chesapeake Biological Laboratory, Solomons, Md. The tag returns, though few in number, suggested that shad return to their native stream to spawn, but did not prove it conclusively.

[3]Walburg and Sykes (1957). In 1952 the estimated total catch of shad in the Potomac River was 853,066 pounds, the fishing rate 58 percent, and the population weighed 1,470,035 pounds.

[4]Walburg (1955). This paper presents annual estimates of weight of the population, fishing rate, and spawning escapement of shad in the Maryland part of Chesapeake Bay for the years 1944 to 1952.

[5]Walburg (1954). This paper presents data on mortality of shad transported from Susquehanna Flats in Chesapeake Bay and released in impoundments in Susquehanna River, and observations on movements of tagged fish.

[6]Whitney (1961). The author concluded that there was no indication that shad and striped bass fisheries would benefit appreciably if passage for the species were provided at Conowingo Dam.

[7]Unpublished: Cooperative study with the Bureau of Sport Fisheries and Wildlife, Maryland Department of Research and Education, Pennsylvania Fish Commission, and New York Conservation Department. Analyses of tag returns and interpretation of tracking tapes are incomplete. Study continued in 1966.

[8]Cooperative studies with the Maryland Department of Research and Education and the Maryland Department of Tidewater Fisheries.

[9]Unpublished: Analyses of tag returns incomplete.

[10]Lewis (1961). Petersen tags were returned selectively from gill nets in some size classes of striped bass as compared to nylon streamer and jaw ring tags. There was little difference in the suitability of jaw ring and streamer tags. The streamer tag was chosen only because it was easier to obtain than the jaw ring tag.

[11]Mansueti (1961). Tagging results showed that the bulk of the tagged fish remained in the Maryland part of Chesapeake Bay. Three tagged fish were recaptured outside the bay on the Atlantic coast, and two were taken in the Virginia part of the bay. Exchange between bay and river populations of Maryland fish was not very great.

[12]Unpublished: Submitted for publication in Chesapeake Science. The paper presents information on the seasonal pattern of movement of striped bass tagged and released in the Potomac River. Data are presented also to show that stocks of fish from other Chesapeake Bay tributaries overwinter in the Potomac, and that fish from this river contribute materially to the stocks of striped bass occurring along the northeast Atlantic coast.

[13]Unpublished: Preliminary findings indicated the annual spawning population weighed about 2,650,000 pounds and the fishing rate was about 40 percent.

[14]Unpublished: Preliminary analysis of the tag returns indicated that the population of fish available to the winter gill net fishery weighed about 1,000,000 pounds and the fishing rate was about 16 percent. Tag returns also indicated that there was considerable winter movement by the fish in the bay.

Table 5.--Continued

State	Species	Locality	Month/year	Collection gear	Type of tag	Number of fish tagged	Fork length range	Age group	Nature of the study
							(Inches)	(Years)	
Virginia[15]	American shad	James River	Apr.-June/1952	Pound net	Petersen tag	374	10.9-19.1	do.	Population estimate and spawning escapement[16]
		Chesapeake Bay	do.	do.	do.	1,395	12.3-20.3	II-VII	Population estimate and fishing rate[17]
		York River	Apr.-June/1959	do.	Nylon streamer tag	842	13.2-19.0	III-VII	Population estimate and fishing rate[18]
		Mattaponi and Pamunkey Rivers	do.	Drift gill	Petersen tag	313	do.	do.	Homing tendency[19]
	Striped bass	James River	Mar./1957	Stake gill net and haul seine	Petersen tag Nylon streamer tag	214 207	7.8-22.6	I-V	Seasonal movement[20] and tag selectivity[10]
		Rappahannock River	Apr./1957	do.	Petersen tag Nylon streamer tag	340 297	7.5-34.5	I-XIV	Do.
		York River	Feb.-Mar./1957-58	Stake gill net, haul seine, and otter trawl	Petersen tag Nylon streamer tag	200 1,171	7.5-34.8	do.	Do.

[15]Cooperative studies with the Virginia Institute of Marine Science, Gloucester Point, Va.

[16]Walburg and Sykes (1957). The study indicated that in 1952 the commercial catch of shad in the James River was 993,963 pounds, the fishing rate 73 percent, and the size of run 1,363,149 pounds.

[17]Walburg and Sykes (1957). The authors concluded that there was a significant difference in the tag-recovery-catch ratio, therefore, the tag return data could not be used to estimate the weight of the shad population and escapement.

[18]Nichols and Massmann (1963). The findings showed an estimated catch of 463,000 pounds of shad, a fishing rate of 55.2 percent, and a total population of 839,000 pounds in 1959. The fishing rate and population size for each year 1953 through 1958 were calculated.

[19]Nichols (1960). The findings suggested that shad having spawned once in the York River would return to spawn again in the same river system.

[20]Massmann and Pacheco (1961). This paper shows that most fish recaptured in fall and winter were taken in the same river system in which they were tagged, while some of those recaptured in spring and summer moved considerable distances. The distribution of tag returns suggested that subpopulations of striped bass were present in the York, Rappahannock, and James Rivers.

Table 6.--Tagging summary of American shad, Alosa sapidissima (Wilson), and striped bass, Roccus saxatilis (Walbaum), in the South Atlantic States by the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N. C., and cooperative agencies, 1950-65

State	Species	Locality	Month/year	Collection gear	Type of tag	Number of fish tagged	Fork length range	Age group	Nature of the study
							(Inches)	(Years)	
North Carolina	American shad	Lower Neuse River	Jan.-Mar./1953	Pound net	Petersen tag	303	13.1-20.1	III-VI	Population estimate and fishing rate[1]
		Upper Neuse River	Apr.-May/1953	Haul seine and fishway trap	Petersen tag Nylon streamer tag	66 38	13.6-19.5	III-V	Homing tendency[2]
		Lower Neuse River	Feb./1958	Pound net	Petersen tag Nylon streamer tag	5 5	13.5-17.4	III-IV	Fish passage by Goldsboro Dam[3]
		Cape Fear River	Mar.-May/1964-65	Drift gill net	Nylon streamer tag	913	12.2-19.4	II-V	Population estimate, escapement distribution, and efficiency of locks for fish passage[4]
	Striped bass[5]	Albemarle Sound	Oct.-Mar./1955-57	Pound net, anchor gill net, and haul seine	Petersen tag Nylon streamer tag Spaghetti tag	593 818 608	7.7-31.0	0-VIII	Tag suitability[6], population estimate[7], and migration[8]

[1]Walburg (1957). This paper gives the estimated commercial catch (98,000 shad), fishing rate (65 percent), spawning escapement (151,000 fish), and pertinent life history information.

[2]Unpublished: Data inconclusive.

[3]Unpublished: Recaptures too few for valid conclusions.

[4]Unpublished: Preliminary results indicated that the population size was 259,200 shad, the commercial catch 69,250 fish, and the fishing rate 27 percent. The spawning escapement was 109,410 shad to the North East Cape Fear River, 4,560 to the Black River, and 75,980 to the Cape Fear River above the junction of the Black. No conclusions could be made about the efficiency of locks for fish passage because of the small number of tagged fish recovered.

[5]Cooperative studies with William W. Hassler of North Carolina State University at Raleigh.

[6]Davis (1959). This paper concluded that the streamer type tag was the most satisfactory of the tags tested.

[7]Unpublished: Preliminary findings indicated that about 1,544,200 and 1,488,600 pounds of striped bass were available to the commercial fisheries in Albemarle Sound at the start of the 1956-57 and 1957-58 seasons, respectively. The fishing rate was about 35 percent.

[8]Unpublished: A total of 1,632, or 31.1 percent, of the striped bass tagged and released were recaptured. The bulk of the recaptured fish remained in North Carolina waters. Seven tagged fish were recaptured outside North Carolina waters: 1 off the North Carolina coast, 5 in Chesapeake Bay and tributaries, and 1 in Cape Cod Bay, Mass.

Table 6.--Continued

State	Species	Locality	Month/year	Collection gear	Type of tag	Number of fish tagged	Fork length range	Age group	Nature of the study
							(Inches)	(Years)	
		Croatan Sound	Oct.-Mar./1955-57	Pound and anchor gill nets	Petersen tag Nylon streamer tag Spaghetti tag	347 530 23	8.2-24.3	I-V	Do.
		Chowan River	Nov./1955	do.	Petersen tag	5	10.5-16.7	II-III	Do.
		do.	Oct./1956-57	do.	Nylon streamer tag Spaghetti tag	79 6	9.1-16.5	I-III	Do.
		Perquimans River	Oct.-Dec./1956	Anchor gill net	Nylon streamer tag Spaghetti tag	296 298	8.5-21.2	I-V	Do.
		Alligator River	Dec./1956	Haul seine	Nylon streamer tag	32	12.1-20.7	II-V	Do.
		Pasquotank River	Oct./1957	Anchor gill net	do.	125	9.5-20.2	I-IV	Do.
		Little River	Jan.-Mar./1957	Haul seine	do.	619	8.6-27.6	II-VIII	Do.
		N. C. Coast	Dec./1956	do.	Petersen tag	168	21.5-48.8	IV-XVIII	Migration[9]
		Roanoke River	Mar.-June/1956-65	Anchor gill, drift gill, bow, and hoop nets, haul seine and trot line	Nylon streamer tag Spaghetti tag	4,232 513	11.4-29.5	II-IX	Population estimate[10], migration[8], and homing tendency[11]
South Carolina	American shad	Edisto River	Feb.-Mar./1955	Drift and anchor gill nets	Petersen tag	128	18.8-20.3	III-VI	Population estimate and fishing rate[12]
	Striped bass	--	--	--	--	None	--	--	--
Georgia	American shad	Ogeechee River	Feb.-Mar./1954	Drift gill net	Petersen tag	235	14.8-20.8	III-VI	Population estimate and fishing rate[13]
	Striped bass	--	--	--	--	None	--	--	--
Florida	American shad	St. Johns River	Dec.-Mar./1952-53	Haul seine and drift and stake gill nets	Petersen tag	882	9.9-19.0	II-VI	Population estimate and spawning escapement[14]
		do.	Nov.-Mar./1957-58	Haul seine	do.	950	13.0-19.0	III-VI	Fishing rate and size of run[15]
	Striped bass	--	--	--	--	None	--	--	--

[9]Chapoton and Sykes (1961). This paper suggests that large striped bass from 6 to 75 pounds make extensive coastal migrations. Tagged fish were recaptured in the commercial fisheries of North Carolina and Chesapeake Bay prior to or during the spawning season and by sport fisheries along the coast north of Chesapeake Bay.

[10]Unpublished: Preliminary findings indicated that the average annual striped bass spawning population entering the Roanoke River was about 267,250 fish and the fishing rate was about 13 percent.

[11]Unpublished: Preliminary findings indicated that spawning striped bass returned to the same spawning area each year.

[12]Walburg (1956). The findings showed that the estimated number of shad entering the Edisto River was 56,000 fish and the commercial fishing rate was approximately 20 percent.

[13]Sykes (1956). This paper indicated that the commercial catch of shad in the Ogeechee River was 20,096 fish, the total population was 35,508 fish, and the combined fishing rate by commercial and sport fisheries was 66 percent.

[14]Unpublished: Results were inconclusive and therefore not used for population estimate.

[15]Walburg (1960). This paper presents a method of determining the size and spawning escapement of the shad population of the St. Johns River and population parameters are given for each year 1953 to 1958.

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